ABSTRACT

The present invention relates to a method for gas-solid contacting in a bubbling fluidized bed reactor by:

(a) introducing into a reactor with bed length to bed diameter ratio below about 5.0, a primary gas consisting essentially of reactant(s) of the reaction to be carried out in the bed of solid particles through a primary gas distributor located at the reactor bottom at a superficial gas velocity U_p, which is very close or equivalent to the minimum fluidization velocity U_{mf}, required for achieving the incipient fluidization of the solid particles in the bed to obtain an emulsion phase consisting essentially of the solid particles and the primary gas with little or no formation of gas bubbles to achieve incipient fluidization or liquid-like behaviour of fluidizable solid particles;

(b) forming gas bubbles in the incipiently fluidized bed by introducing through a secondary gas distributor located immediately above the primary gas distributor a secondary gas, selected from one of the reactants which is used in excess of that required for the reaction stoichiometry, steam, an inert or a mixture of two or more thereof at a superficial gas velocity, U_s, which is related to the superficial velocity of the primary gas such that a ratio of the superficial velocity of the secondary gas to the superficial velocity of the primary gas U_s/U_p, is in the range from about 0.5 to about 10.0, preferably from about 1 to about 5.